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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/677,578	10/02/2003	David L. Churchill	115-007	9298

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EXAMINER

WHITTINGTON, KENNETH

ART UNIT	PAPER NUMBER
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2862

DATE MAILED: 06/21/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	Application No. 10/677,578	Applicant(s) CHURCHILL ET AL.	
	Examiner Kenneth J. Whittington	Art Unit 2862	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 11 May 2005.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-31 and 33-36 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 28-31 and 33-35 is/are allowed.
- 6) ☒ Claim(s) 1-27 and 36 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 20 October 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.



**Bot Ledynh**  
Primary Examiner

**Attachment(s)**

- |   |   |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)             | 4) <input type="checkbox"/> Interview Summary (PTO-413)                     |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)    | Paper No(s)/Mail Date. _____  |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date _____   | 6) <input type="checkbox"/> Other: _____                                    |

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**DETAILED ACTION**

The Amendment filed May 11, 2005 has been entered and considered. In view thereof, the objections to the drawings, specification and claims have been withdrawn.

5

***Claim Rejections - 35 USC § 103***

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

10        Claims 1-10, 15, 18-21, 23, and 25-27 are rejected under 35  
U.S.C. 103(a) as being unpatentable over Roeger. Regarding  
claims 1-6, Roeger teaches a transducer cartridge comprising a  
housing holding a sensor (See Roeger FIG. 1), said sensor  
including a coil and a captive core (See FIG. 1, items 28, 30,  
15 32, 46, 48, 50 and 51), wherein an electrical measurement of  
said coil provides information about displacement or velocity of  
said captive core (See col. 1, lines 10-34), further wherein  
said coil has an axis extending in a first direction (See FIG.  
1), said housing comprising a support for the captive core  
20 wherein resistance to lateral force provided by the support is  
independent of displacement of the core (See FIG. 1, items 34  
and 38 and col. 1, lines 54-57).

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However, Roeger does not explicitly teach the dimensions of the device as recited in claims 1-6. Nonetheless, modifying Roeger to have the relative dimensions as recited in the claims would be obvious to one having ordinary skill in the art through  
5 routine experimentation because where the only difference between the prior art and the claims was a recitation of relative dimensions of the claimed device and a device having the claimed relative dimensions would not perform differently than the prior art device, the claimed device is not patentably  
10 distinct from the prior art device. See *Gardner v. TEC Systems, Inc.*, 220 USPQ 777 (Fed. Cir. 1984), *cert. denied*, 225 USPQ 232 (1984). One having ordinary skill would thus be motivated to do in view of Roeger, which recognized a need for a small sized transducer (See col. 1, lines 25-30).

15 Regarding claim 7, Roeger teaches the captive core extending into said coil (see FIG. 1).

Regarding claim 8, Roeger teaches the captive core having a first portion having a first diameter (See FIG. 1, item 46), wherein said captive core further includes a second portion  
20 having a diameter greater than said first diameter for retaining said core within said housing (See FIG. 1, items 48 and 50), and wherein said captured core is supported in said housing by a

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first bearing and by a second bearing (See FIG. 1, items 34 and 38, one slide bearing on each side of the core).

Regarding claim 9, Roeger teaches the first bearing being connected to said housing, wherein the core slides within a hole  
5 in said first bearing (See FIG. 1).

Regarding claim 10, Roeger teaches second bearing is mechanically mounted to said housing (See items 12, 34 and 38), wherein said core slides within a first hole in said first bearing and within a second hole in said second bearing (See  
10 FIG. 1).

Regarding claim 15, Roeger teaches the sensor being an induction sensor or eddy current sensor (See col. 1, lines 10-12).

Regarding claim 18, Roeger teaches the sensor being a three  
15 coil device (See FIG. 1).

Regarding claim 19, Roeger teaches a spring to provide a return force to said core (See FIG. 1, item 72).

Regarding claim 20, Roeger teaches the core extending through said spring and into said coil (See FIG. 1).

20 Regarding claim 21, Roeger teaches the core including a ferromagnetic material (See col. 1, lines 53-57).

Regarding claim 23, Roeger teaches the core further comprising a contact point for making contact with an object to

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be measured, wherein said contact point is made of a hard material that resists wear (See FIG. 1, item 64).

Regarding claim 25, Roeger teaches a core stop to capture said core within said housing, wherein said core stop further  
5 limits extension of said spring (See FIG. 1, core stop item 68 and also note sleeves 38 can be core stops that interact with steps in core parts 48 and 50).

Regarding claim 26, Roeger teaches the core stops sized to have a diameter equal to inside of housing and provides a  
10 guiding function for the core (See FIG. 1, note bearings 34 and 38 with core stops as noted above interacting with core portions 48 and 50 are core stops and have guide functions).

Regarding claim 27, Roeger teaches lead wires electrically connected to said coil and extending to a circuit (See FIG. 1,  
15 item 16).

Regarding claim 36, Roeger teaches said core extending out from said housing from said first bearing (See FIG. 1, note ball 64 on end of core extends from the housing), wherein said second bearing is spaced a distance from said first bearing to provide  
20 resistance to lateral forces on said core where it extends from said housing while allowing free axial movement of said core (See FIG. 1, items 34 and 38).

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Claims 1-7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hiramatsu et al. (US 6,710,592). Regarding claims 1-6, Hiramatsu et al. teaches a transducer cartridge comprising a housing holding a sensor (See Hiramatsu et al. FIG. 22A), said sensor including a coil and a captive core (See FIG. 1, items 30, 31, 51 and 52), wherein an electrical measurement of said coil provides information about displacement or velocity of said captive core (See col. 1, lines 7-13), further wherein said coil has an axis extending in a first direction (See FIG. 22A), said housing comprising a support for the captive core wherein resistance to lateral force provided by the support is independent of displacement of the core (See FIGS. 10 and 20, note bushing and balls providing linear displacement while providing resistance to lateral movement).

However, Hiramatsu et al. does not explicitly teach the dimensions of the device as recited in claims 1-6. Nonetheless, modifying Hiramatsu et al. to have the relative dimensions as recited in the claims would be obvious to one having ordinary skill in the art through routine experimentation because where the only difference between the prior art and the claims was a recitation of relative dimensions of the claimed device and a device having the claimed relative dimensions would not perform

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differently than the prior art device, the claimed device is not patentably distinct from the prior art device. See *Gardner v. TEC Systems, Inc.*, 220 USPQ 777 (Fed. Cir. 1984), cert. denied, 225 USPQ 232 (1984).

5        Regarding claim 7, Hiramatsu et al. teaches the captive core extending into said coil (see Hiramatsu et al. FIG. 22A).

Claims 8 and 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hiramatsu et al. as applied to claim 1  
10 above, and further in view of Chass (US 6,356,072). Hiramatsu et al. teaches the limitations of claim 1 and regarding claim 8, Hiramatsu et al. teaches the captive core having a first portion having a first diameter (See FIG. 22B, item 52), wherein said captive core further includes a second portion having a diameter  
15 greater than said first diameter for retaining said core within said housing (See FIG. 22A, item 51), and wherein said captured core is supported in said housing by a first bearing (See FIG. 20, linear bush 4 and balls). However, Hiramatsu et al. does not explicitly teach a second bearing. Chass teaches a second  
20 bearing for use in a linear transducer (See Chass FIGS. 22-27, note item 24). It would have been obvious to use the second bearing of Chass in Hiramatsu et al. One having ordinary skill in the art would have been motivated to keep the core assembly



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centered in the coil as suggested by Chass (See Chass col. 4, lines 35-48).

Regarding claim 11, this combination teaches the second bearing integral with the second portion and moving with the  
5 core (See Chass FIGS. 22-27).

Claim 12 is rejected under 35 U.S.C. 103(a) as being unpatentable over Hiramatsu et al. in view of Chass, and further in view of Jones et al. (US 2002/0153982). The combination of  
10 Hiramatsu et al. in view of Chass teaches the limitations of claims 1, 8 and 11 as noted above. However, they do not teach of the particular material for the bearings. Jones teaches using artificial ruby or sapphire bearings in a linear actuator (See Jones et al. page 2, paragraph 0023). It would have been  
15 obvious to use such bearings in the noted combination because such bearings reduce friction in the apparatus and a low variance in broad temperature ranges (See Jones et al. same paragraph).

20 Claims 13 and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hiramatsu et al. in view of Chass, and further in view of Arms et al. (US 5,777,467). Regarding claim 13, the combination of Hiramatsu et al. in view of Chass teach

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the limitations of claims 1, 8 and 11 as noted above. However, they do not teach of the particular material for the core, while they do require the material to be non-magnetic. Arms et al. teaches using a super-elastic material, such as nickel-titanium alloys, for a core in a linear transducer (See Arms et al. col. 2, line 49 to col. 3, line 63). It would have been to a person having ordinary skill in the art to use the nickel-titanium alloy for the core in the sensor of Hiramatsu et al. in view of Chass. One would have been motivated to do so to allow for bending of the core in certain conditions without the core bending in order to accommodate for any misalignment (See Arms et al. col. 3, lines 48-52).

Regarding claim 14, nitinol is a nickel-titanium alloy, thus the noted combination teaches this claim.

15

Claims 16 and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Roeger as applied to claims 1 and 15 above, and further in view of Admission (page 6 of Specification, lines 8-9). Roeger teaches each and every limitation of claims 1 and 15 as noted above. However, this combination teaches of only a three coil design. Nonetheless, it would have been obvious to use a one or two coil design, because as admitted by Applicant, using one, two or three coils

in such a device are well known in the art alternatives (See Specification page 6, lines 8-9). Thus, one having ordinary skill would be motivated to use any of the coil designs depending on the particular requirements of the system.

5

Claim 22 is rejected under 35 U.S.C. 103(a) as being unpatentable over Roeger as applied to claims 1 and 21 above, and further in view of Davis et al. (US 4,347,492). Roeger does not explicitly disclose the type of magnetic material used in  
10 the core. Davis et al. teaches a core in a similar device being made of iron. It would have been obvious to use iron in as the magnetic material because iron and iron alloys (ferrite) are well known magnetic materials in the art (See Davis et al.; see also Ko et al. US 5,642,043).

15

Claim 24 is rejected under 35 U.S.C. 103(a) as being unpatentable over Roeger as applied to claims 1 and 23 above, and further in view of Sturdevant (US 5,414,940). Roeger does not explicitly disclose the hardened tip material. Sturdevant  
20 teaches using a ruby tip for in a contact position sensor (See FIG. 1, item 14). It would have been obvious to use the ruby tip of Sturdevant because as is well known in the art, ruby

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material is sufficiently hard enough that it will not wear after extended use.

***Allowable Subject Matter***

5        Claims 28-35 are allowed.

      The following is an examiner's statement of reasons for allowance:

      Regarding claim 28, the prior art does not disclose both the first and second length of contact between the captive core and the first and second bearings, respectively, being less than the stroke length, in combination with the other features of the claims. Claims 29-35, because of their dependency on claim 28, are allowable for the same reason therefor.

      Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

20                                    ***Response to Arguments***

      Applicant's arguments, filed May 11, 2005 (See Remarks, pages 9-10 of Amendment), with respect to claims 28-35 have been

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fully considered and are persuasive. The rejection of these claims has been withdrawn.

Applicant's arguments with respect to the remaining claims have been fully considered but they are not persuasive.

5        Regarding the obvious rejection of the claims over Roeger, Applicants' first assertion for patentability is that Roeger does not teach a support in the manner as recited in the claims (See Remarks, pages 10-11). Applicants indicate that the spring (See Roeger FIG. 1, item 52) is the feature of Roeger that  
10       provides this support. However, while the spring operates in the manner as noted by Applicants, the spring is not the only support that acts upon the captive core. The bearing assembly (See Roeger FIG. 1, items 34 and 38) acts as supports for the captive core and provide resistance to lateral forces by guiding  
15       the captive support for reciprocal lateral movement (See Roeger col. 1, lines 54-57). Thus, while the springs do not act in the manner recited in the claims, this bearing assembly does.

      Regarding Applicants' arguments with respect to the obvious rejections over both Roeger and Hiramatsu et al. regarding the  
20       specific dimensions of the device, Applicants' attention is again directed to Gardnder v. TEC systems, Inc., 220 USPQ 777 at 783-786 (CAFC 1984), which states that a claimed device is not patentably distinct from a prior art device if the only

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difference between them are relative dimensions. Applicants must show that the claimed device in view of these limitations performs and operates differently from the prior art device.

Id., at 786. Applicants have only further asserted that both

5 Roeger and Hiramatsu et al. are more complicated than the claimed invention. While such statements may be true, such statements do not patentably distinguish Roeger and Hiramatsu et al. from the claimed invention.

Applicants also assert that the prior art devices would  
10 have to eliminate parts to arrive at the claimed invention. However, limitations directed to elimination of parts is not claimed. While the claims are read in light of the specification, limitations in the specification are not read into the claims.

15 Because claims 1-27 and 36 do not patentably distinguish over the prior art devices, the rejections stand.

### ***Conclusion***

The prior art made of record and not relied upon is  
20 considered pertinent to applicant's disclosure. The newly cited prior art devices disclose various linear measurement probes.

Applicant's amendment necessitated the new and/or amended grounds of rejection presented in this Office action.

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Accordingly, **THIS ACTION IS MADE FINAL.** See MPEP § 706.07(a).

Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action  
5 is set to expire THREE MONTHS from the mailing date of this  
action. In the event a first reply is filed within TWO MONTHS  
of the mailing date of this final action and the advisory action  
is not mailed until after the end of the THREE-MONTH shortened  
statutory period, then the shortened statutory period will  
10 expire on the date the advisory action is mailed, and any  
extension fee pursuant to 37 CFR 1.136(a) will be calculated  
from the mailing date of the advisory action. In no event,  
however, will the statutory period for reply expire later than  
SIX MONTHS from the date of this final action.

15 Any inquiry concerning this communication or earlier  
communications from the examiner should be directed to Kenneth  
J. Whittington whose telephone number is (571) 272-2264. The  
examiner can normally be reached on Monday-Friday, 7:30am-  
4:00pm.


20 If attempts to reach the examiner by telephone are  
unsuccessful, the examiner's supervisor, Edward Lefkowitz can be  
reached on (571) 272-2180. The fax phone number for the

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organization where this application or proceeding is assigned is  
703-872-9306.

Information regarding the status of an application may be  
obtained from the Patent Application Information Retrieval

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10 access to the Private PAIR system, contact the Electronic  
Business Center (EBC) at 866-217-9197 (toll-free).

  
Kenneth J Whittington  
Examiner  
Art Unit 2862

kjw